



Information Displays for Fluidic Control Systems

70

These display products, excluding the fluidic-mechanical counter, all operate on the same principle. They contain non-wearing, air-lubricated floating pistons. They are powered directly by FLOWBOARD gate signals.

Ends of the pistons are visible through wide-angle windows when they are driven forward. Pistons are not visible when driven back. White pistons are standard. Colors are available. All backgrounds are black.

The pop-up indicator contains a single piston. It operates in a double-acting cylinder that has two connections. It thus requires complementary signals from two sources when mounted other than vertically.

The 5 by 7 matrix displays can accommodate 35 pistons, but may be supplied with fewer for certain applications. They may have connections to individual cylinders or to groups of cylinders. Lubricating air that leaks past actuated pistons creates a positive pressure at the front, under the window. This pressure drives back those pistons which are not actuated.

Different connection arrangements satisfy the multiplicity of dot patterns offered by the piston array. For generating line segments a group of cylinders may be connected to one signal source.

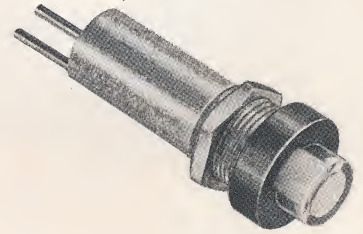
The numeric readout, for example, is a 5 x 7 matrix. Seven segments, each consisting of three adjacent dots, can be controlled to yield the familiar seven bar display of the digits 0 through 9.

The alphanumeric readout has provision for 35 separate connections. Each dot can be controlled by a separate gate. The monitor display, also a 5 by 7 array of dots, is shown separately to emphasize its unique application. Functionally this display can show 35 bits of information related to a machine or process. It need not generate a recognizable character in the usual sense.

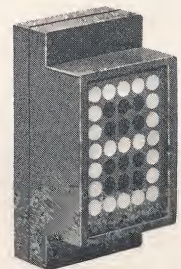
The single character readout is arranged to display only one letter, number or symbol. It is operated through two connections, forward and return. Any alpha, numeric or special symbol feasible on a 5 by 7 matrix can be supplied.

The fluidic-mechanical counter is a conventional counter driven by amplified fluidic pulses. A fluidic signal input is fed through a three-way sensor relay. The relay, in turn, operates a fluidic power amplifier that drives a diaphragm-actuated counter mechanism.

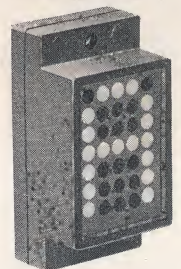
6080 009
Pop-up Indicator



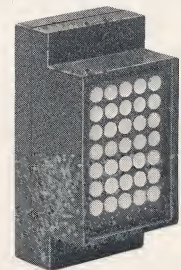
6080 004
Numeric Readout



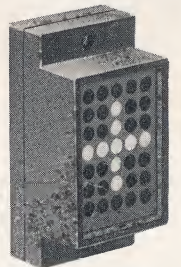
6080 005
Alphanumeric Readout



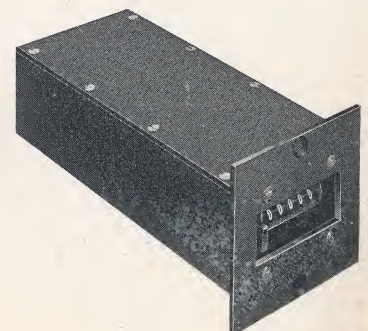
6080 005
Monitor Display



6090 026
Single Character Readout



6080 060
Fluidic-Mechanical Counter



What it does

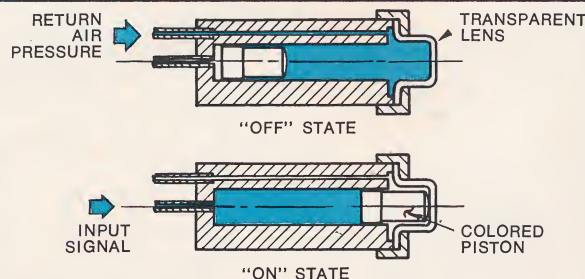
Schematic

Typical Performance

6080 009

Pop-up Indicator

Displays a white or colored dot against a black background in response to a signal — or a blank, black window in response to a complementary signal.

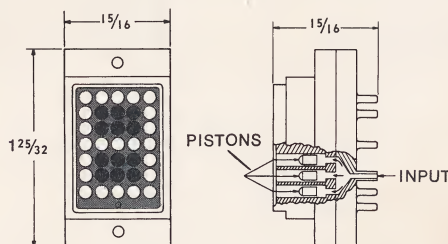


Rapid visual response — operating pressure differential, 0.2 psig min. — maximum operating pressure 5 psig.

6080 004

Numeric Readout

Displays any decimal digit from 0 through 9 in a styled pattern of dots which appear as line segments.

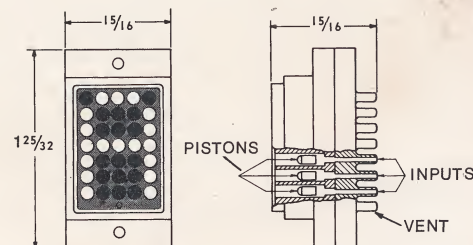


Rapid visual response — operating pressure, 0.2 psig min. — 1.0 psig max.

6080 005

Alphanumeric Readout

Displays any letter, number or symbol as a pattern of dots.

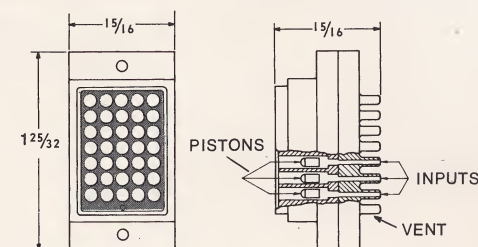


Rapid visual response — operating pressure, 0.2 psig min. — 1.0 psig max.

6080 005

Monitor Display

Displays a pattern of individually controllable dots on a 5 by 7 matrix for monitoring the digital states of machines or circuits.

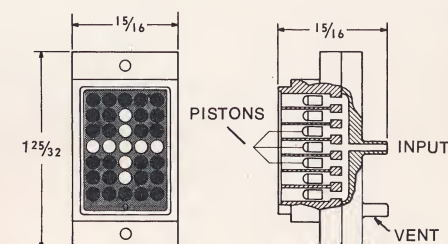


Rapid visual response — operating pressure, 0.2 psig min. — 1.0 psig max.

6090 026

Single Character Readout

Displays a pre-arranged number, letter or symbol in response to a fluidic signal.

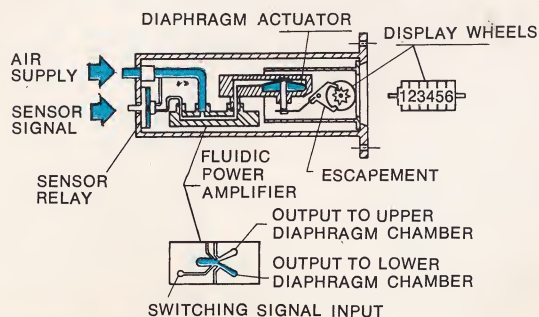


Rapid visual response — operating pressure, 0.2 psig min. — 1.0 psig max.

6080 060

Fluidic-Mechanical Counter

Displays a six-digit decimal number — advances one count in response to a low-level fluidic count pulse — has manual reset to zero.



40 ms cycle time — 1500 counts per minute max. — minimum operating signal, 0.1 psig.



Electrofluidic Interfaces for Fluidic Control Systems

6090 002 Electrofluidic Transducer

The electrofluidic transducer is a high-speed, no-moving parts, solid-state device for converting an electrical signal to a fluidic signal. As with the Fluidic Ear, this transducer utilizes the phenomenon of acoustic energy disturbing a laminar stream.



Electrofluidic Transducer

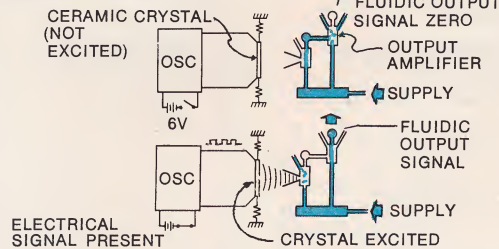


Electrofluidic Pulse Generator

The electrofluidic transducer, used with an electronic, variable frequency pulse generator provides a valuable laboratory instrument for examining fluidic circuits under varying dynamic conditions.

6090 001 Electrofluidic Pulse Generator

Schematic



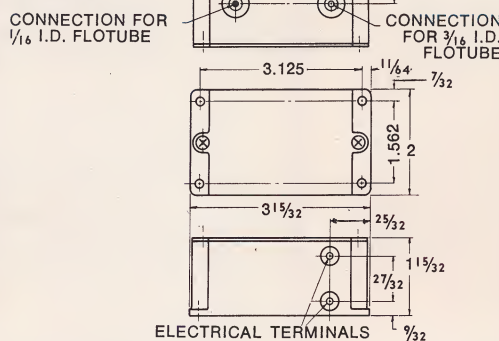
What it does

Delivers a fluidic signal equivalent to the output of a FLOWBOARD gate in response to an electrical input signal. The electrical signal produces 50 KHz acoustic energy for turning off a sound sensitive fluid amplifier which controls a FLOWBOARD gate.

Typical Performance

2 ms switching time — no moving parts. Will deliver square wave fluidic pulses from 2 to 200 Hz.

Installation Details

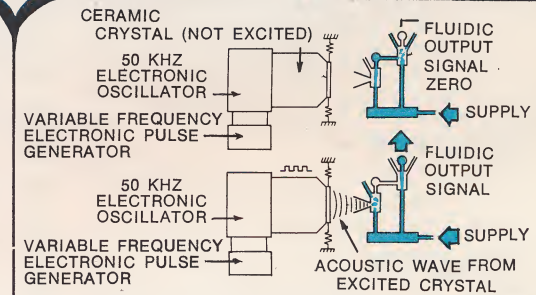


Application Considerations

Transducer requires 78 milliamperes at 6 to 8 volts d.c. Simple circuit changes permit operation at other d.c. or a.c. voltages. Clean air supply is standard 1.0 to 1.6 psig.

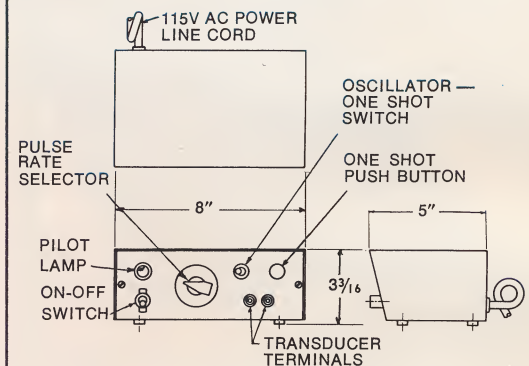
Typical Uses

- to interface electronic circuits to fluidic circuits
- to monitor status of electrical power equipment
- for input signals from distant points
- as a pulse generator with electrical oscillator input



Delivers a train of square-wave fluidic pulses at an adjustable repetition rate — also a push-button controlled one-shot pulse — output signals equivalent to output of a FLOWBOARD gate.

Manual repetition rate adjustment between 2 and 200 pulses per second (this product consists of an electrofluidic transducer driven by an electronic oscillator).



Electrical power supply 115 volts ac required — clean air supply is standard 1.0 to 1.6 psig.

- as an adjustable clock for time-based sequencing of machine functions
- with a fluidic counter, as a programming component
- for pacing production rates

The products you will need for complete fluidic control systems are available from Pitney-Bowes

The fluidic products described in this publication have been grouped together for your convenience in making comparisons during the selection process. They are a segment of our complete line of compatible standard components. All Pitney-Bowes fluidic controls are designed to operate with one another in systems. No tuning or matching is necessary.

Here is a listing of current standard products and the publications in which application data can be found. Your Pitney-Bowes representative or field engineer can provide additional information.

	Publications	Products
Input Devices Fluidic sensors with unique capabilities and excellent resistance to adverse environments have been developed by Pitney-Bowes. Interface components for introducing information manually or from other signal modes into the fluidic system are also available.	Interruptible Sensors Proximity Sensors Sensor Relays Panel Operators Electrofluidic Interface	Opposed Jets Sensor, Emitter-Receiver Diaphragm Sensor, Fluidic Ear Back Pressure Sensor, Proximity Sensor, Acoustic Proximity Sensor 2-Way Sensor Relay, 3-Way Sensor Relay Push Button Magnetic Valve, 12-Position Selector Valve Electrofluidic Transducer, Electrofluidic Pulse Generator
Output Devices The information processed by a fluidic system at low power levels is often used to control substantial amounts of energy. Appropriate outputs are available to do this work. At the same time fluidic readouts allow the display of numbers, letters, symbols or special characters as desired.	Power Amplifiers Information Display Fluidic-Electric Interface	Fluidic Power Amplifier 1-4 psig monostable, Fluidic Power Amplifier 1-4 psig bistable, Fluidic Power Amplifier 1-8 psig monostable, Booster 20 to 120 psig, Booster 1 to 20 psig, 3-Way Sensor Relay Pop-Up Indicator, Numeric Readout, Alphanumeric Readout, Monitor Display, Single Character Readout, Fluidic-Mechanical Counter Fluidic-Electric Miniswitch Fluidic-Electric Switch
Logic The Pitney-Bowes FLOWBOARD made fluidics practical and economical for industrial controls. It is a versatile, trouble-free way of packaging the NOR logic gates which process control data. FLOWBOARD gates are compatible with one another and with external fluidic components furnished by Pitney-Bowes.	FLOWBOARDS FLOWBRIK Integrated Circuits	FLOWBOARD 22, FLOWBOARD 8 STANDARD CIRCUITS: One Decade Decimal Up-Counter with Readout Encoder and Unbuffered Complements, One Decade Decimal Up-Counter with Buffered Outputs, One Decade Decimal Up-Counter with Buffered Complements, Two Decade Decimal Up-Counter with Readout Encoder and Unbuffered Complements, Two Decade Decimal Up-Counter with Buffered Complements, Two Decade Binary Coded Decimal Up-Counter, Two Decade Binary Coded Decimal to 7-Bar Encoder, 3-Stage and 6-Stage Binary Counters, 3-Stage and 6-Stage Shift Registers CUSTOM CIRCUITS: Custom circuits to meet specific control requirements may be easily fabricated.
Power Supply The key to achieving the exceptionally high reliability with which fluidic control systems perform in industry is to provide the system with clean, dry air. Pitney-Bowes has developed power supplies that assure contaminant-free air.	Power Supply Components	Dry Air Compressors, Dry Particle Filters, Coalescing Filters, Replacement Filter Cartridges, Pressure Regulators, Pressure Gages.
Packaging Hardware All components needed to assemble a fluidic control system are provided by Pitney-Bowes. Standards for enclosures, arrangement of components and mechanical details have all been worked out to save time, trouble, and cost.	Packaging Hardware	Flotube, Input and Output Connectors, Bulkhead Fittings, Flotube Fittings, Mounting Brackets, Manifolds



Pitney-Bowes
Fluidic Controls

Research Drive, Glenbrook, Conn. 06906

Converting advanced technology into practical application



FLOWBRIK integrated circuits

For one or few-of-a-kind control systems and for bread-boarding both simple and complex circuits, the FLOWBOARD 8 and FLOWBOARD 22 are ideal fluid logic elements. However, for standard counting, encoding, and sequencing circuits and for custom control circuits used in significant quantity, the FLOWBOARD 26 permits more economical and more reliable multi-layered integrated circuit construction.

The edge venting feature of the FLOWBOARD allows stacking of logic elements in alternate layers with circuit boards which provide internal passages between gates. The only connections external to the FLOWBRIK are input and output signals. Such construction offers the advantages of decreased physical size, increased packaging density, minimum external connections, increased reliability and reduced cost.

FLOWBRIK circuit characteristics are identical to those of FLOWBOARD circuits. With this compatibility, portions of a control circuit subject to periodic change may be implemented with FLOWBOARD 8 or FLOWBOARD 22 elements, while fixed control functions may be implemented in FLOWBRIK form. Thus, both configurations may be combined for maximum advantage in a control system.

A number of circuits are available as standard integrated circuits, including counters, readout encoders, shift registers and sequencers. In addition, Pitney-Bowes offers the benefits of integrated circuit construction in the form of custom circuits designed to meet specific customer requirements. Specially fabricated interconnect circuit boards can be packaged into a custom FLOWBRIK with up to 130 NOR logic elements. Because the interconnect circuit boards can be molded with relatively simple tooling, FLOWBRIKS yield significant savings over hand-connected methods even for relatively low quantity applications.



FLOWBRIK integrated circuits are compatible with externally connected FLOWBOARDS, and they offer savings where fluidic circuitry can be standardized for repeated use.

What it Does	Typical Performance	Typical Uses
<p>6090 044 One-Decade Decimal Up-Counter with Read-out Encoder In response to an input count pulse, output signal is advanced sequentially to display decimal integer, from 0 to 9, on a numeric readout — reset input signal returns counter and display to 0 — complementary signals with fan-out of two are also provided for decoding</p>	<p>Requires count pulse duration of 3 ms min. — can accept 150 counts per second — consumes approximately 0.7 scfm at standard 1.3 psig system supply pressure</p>	<ul style="list-style-type: none"> • for multi-level predetermining control • to drive a numeric display • to program events in sequence • to predetermine events based on count
<p>6090 039 One-Decade Decimal Up-Counter with Buffered Outputs In response to an input count pulse, output signal is advanced sequentially to the next decimal outlet port, counts from 0 to 9 — reset input signal returns counter to 0</p> <p>6090 042 One-Decade Decimal Up-Counter with Buffered Complements Functions as above — complementary signals with fan-out of four are provided for decoding</p>	<p>Can accept 150 counts per second, required count pulse duration — 3 ms “on”, and 3 ms “off” — complete reset in 5 ms — consumes approximately 0.7 scfm at standard 1.3 psig system supply pressure</p>	<ul style="list-style-type: none"> • for multi-level predetermining control • to count up to ten • to program events in sequence • to trigger action at a set count • to activate standby unit
<p>6090 037 Two-Decade Decimal Up-Counter with Read-out Encoder In response to an input count pulse, advances output signals sequentially to display two-digit number from 00 to 99 on a numeric readout — reset input signal returns counter to 00 — complementary signals with fan-out of two are also provided for decoding</p> <p>6090 043 Two-Decade Decimal Up-Counter with Buffered Complements Functions as above without readout encoder — complementary signals with fan-out of four are also provided for decoding</p>	<p>Requires count pulse duration of 3 ms min. — can accept 150 counts per second, complete reset in 5 ms — consumes approximately 1.4 scfm at standard 1.3 psig system supply pressure</p>	<ul style="list-style-type: none"> • to drive a two-decade numeric display (6090 037 only) • to count up to 100 • to program events in sequence • for multi-level predetermining control • with a pulse-train input, to time events in sequence
<p>6090 046 Two-Decade Binary Coded Decimal Up-Counter In response to an input count pulse, shifts output signal patterns at four ports to advance BCD code sequentially from 0 to 9 — after ten input count pulses, advances the output signal patterns at four other ports — counts from 00 to 99 in BCD — reset input signal returns counter to 00 — buffered outputs and complements with fan-out of four are provided for decoding</p> <p>6090 047 Two-Decade Binary Coded Decimal to 7-Bar Encoder In response to signals from each of two binary coded decimal sources, generates output signals to display decimal digits on a two-digit numeric readout</p>	<p>Can accept 150 counts per second, required count pulse duration, 3 ms “on” and 3 ms “off” — complete reset in 5 ms — consumes approximately 1.0 scfm at standard 1.3 psig system supply pressure</p> <p>Decodes input signals rapidly — consumes approximately 0.7 scfm at standard 1.3 psig system supply pressure</p>	<ul style="list-style-type: none"> • for internal system counting functions • to reduce complexity of interconnections • to interface with other BCD circuitry • for driving remote readouts with a minimum number of signal lines • to drive a numeric display from BCD counters • used for remote readout to minimize the number of transmission lines

What it Does

6090 038

Three-Stage Binary Counter

In response to an input count pulse, shifts output signal patterns at three ports to advance a binary number sequentially from 000 to 111 (0 to 7 decimal) — reset input signal returns outputs to 000 — separate "set" connections for each binary stage — buffered outputs and complements with fan-out of four are provided for decoding

6090 040

Six-Stage Binary Counter

Functions as above to count from 0 to 63 in binary code

6090 041

Three-Stage Shift Register

In response to an input shift pulse, transfers one bit of YES-NO or ON-OFF information (received from a preceding stage or from an external source) to the next of three memory stages — buffered outputs and buffered complements from each of three stages indicate the status of stored information.

045

Six-Stage Shift Register

Functions as above with 6 memory stages

Typical Performance

Can accept 150 counts per second, required count pulse duration, 3 ms "on" and 3 ms "off" — complete reset in 5 ms — consumes approximately 0.35 scfm at standard 1.3 psig system supply pressure (6-stage counter consumes 0.7 scfm at 1.3 psig supply)

Can accept 150 shifts per second with set and shift pulses 3 ms "on" and 3 ms "off" — shift occurs at trailing edge of shift pulse; consumes approximately 0.35 scfm at standard 1.3 psig system supply pressure (6-stage register consumes 0.7 scfm at 1.3 psig supply)

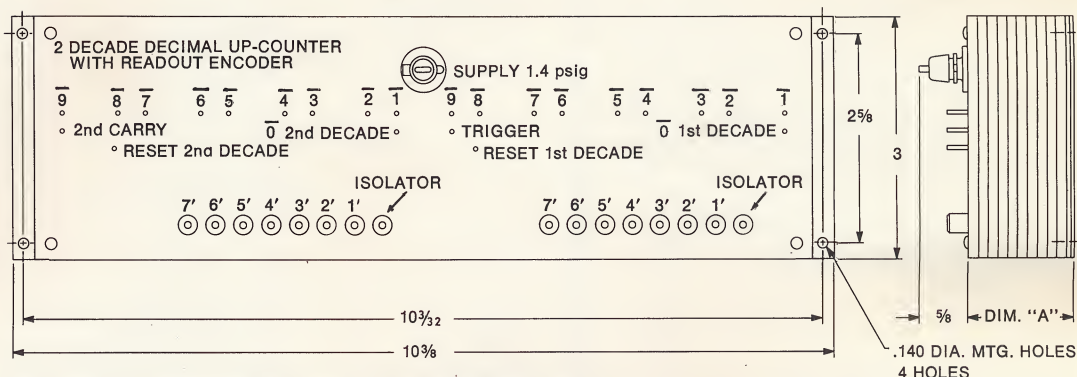
Typical Uses

- to program events in sequence
- to trigger action at a set count
- to activate standby units
- for simple sequential control, where minor decode logic results in an economy of logic elements
- to follow a part through a machine with instructions as to its destination
- to store information required for proper operations of gates, ejectors, deflectors, etc.
- to trigger an action contingent on a succession of events

Installation Details

Part No.	Dim. A	Flowboard Amplifier Levels
6090 037	12 $\frac{1}{32}$	4
6090 038	1 $\frac{1}{16}$	1
6090 039	1 $\frac{1}{4}$	2
6090 040	1 $\frac{1}{4}$	2
6090 041	1 $\frac{1}{16}$	1
6090 042	1 $\frac{1}{4}$	2
6090 043	12 $\frac{1}{32}$	4
6090 044	1 $\frac{1}{4}$	2
6090 045	1 $\frac{1}{4}$	2
6090 046	11 $\frac{1}{32}$	3
6090 047	1 $\frac{1}{4}$	2

Dimensions are in inches



6080 144

Four-Decade Pre-Determining Decimal Up-Counter with Readout

In response to an input count pulse, this unit sequentially counts from 0000 to 9999, driving a 4 digit numeric readout to display the count. A reset input signal returns counter to 0000. Selector dials predetermine the number at which an output signal is delivered. The counter requires an input pulse duration of 3 ms min. and can accept 150 counts per second. Counter completely resets in 5 ms. It consumes approximately 2.8 scfm at 1.3 psig system supply pressure. Typical uses are: to drive a 4 decade numeric display; to program events in sequence; for multi-level control; with a pulse-train input, to time events in sequence.

6080 155

Four-Decade Pre-Determining Decimal Down-Counter with Readout

Functions as above, counting down from 9999 to 0000



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Converting advanced technology into practical application



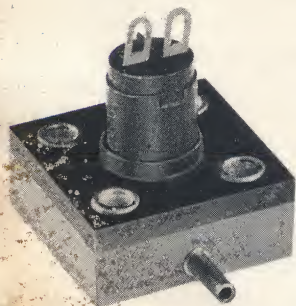
Fluidic-Electric Interfaces for Fluidic Control Systems

6080 157

Fluidic to Electric Mini-Switch

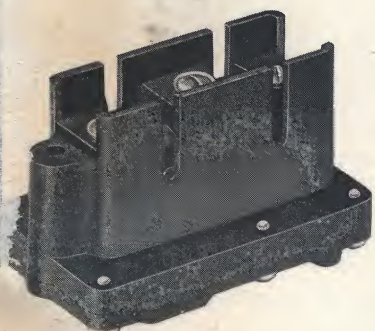
6080 158

Fluidic to Electric Switch



Fluidic to Electric Mini-Switch

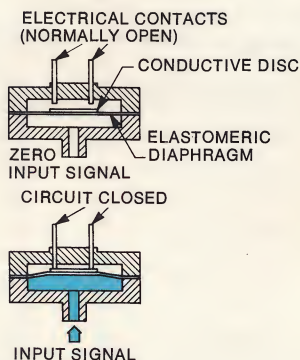
Fluidic to electric output interfaces generally communicate with either electronic or electrical power circuits. For electronic or other low-power applications, the fluidic to electric mini-switch is an ideal, high-speed means for switching up to 100 milliamperes of current with fluidic pressures as low as 1 inch of water. It is a diaphragm-operated, normally-open switch capable of 60 msec response when controlled by a FLOWBOARD amplifier.



Fluidic to Electric Switch

For electrical power circuits involving electric motors, heavy duty relays or other high current requirements, the fluidic to electric switch is an ideal interface for controlling resistive loads up to 10 amperes with fluidic signal pressures as low as 4 inches of water. Its principle of operation is based upon a diaphragm and pivoted plate assembly acting against a precision snap-action switch. The switch has a single-pole, double-throw terminal arrangement and is capable of 60 msec response for single pulse operation from a FLOWBOARD amplifier.

Schematic



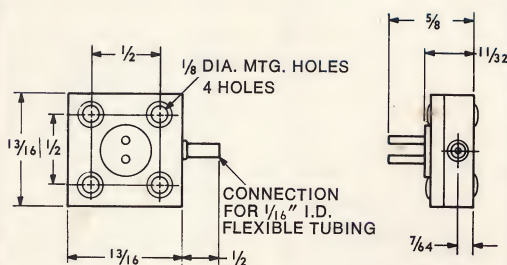
What it Does

Opens and closes electronic control circuits in response to fluidic control signals.

Typical Performance

Diaphragm actuated, normally-open switch rated at 100 ma. — 5 ms response when operated from a FLOWBOARD gate — minimum actuating pressure, 0.03 psig.

Installation Details



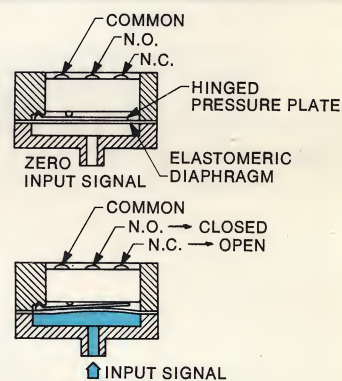
Application Considerations

Can be operated from a FLOWBOARD amplifier or any Pitney-Bowes input sensor — maximum actuating pressure, 2.0 psig — temperature limits, +32°F to +150°F

Typical Uses

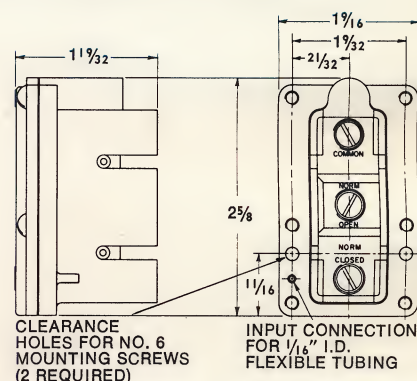
For fluidic control of

- neon lamps, nixie tubes
- incandescent lights
- electric counters, relay contacts



Opens and closes electrical circuits in response to fluidic control signals

SPDT switch rated 10 amperes resistive load at 125 or 250 volts a.c. — 60 ms response when operated from a FLOWBOARD gate — minimum actuating pressure, .15 psig.



Can be operated from a FLOWBOARD amplifier — maximum actuating pressure 10 psig. — temperature limits, — 65°F to +180°F.

For fluidic control of

- motor starters, relays
- solenoids, small motors
- electrical alarms, pilot lamps

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	Sensor Relays	2-Way Sensor Relay, 3-Way Sensor Relay
	Panel Operators	Push Button Magnetic Valve, 12-Position Selector Valve
	Electrofluidic Interface	Electrofluidic Transducer, Electrofluidic Pulse Generator
Output Devices The information processed by a fluidic system at low power levels is often used to control substantial amounts of energy. Appropriate outputs are available to do this work. At the same time fluidic readouts allow the display of numbers, letters, symbols or special characters as desired.	Power Amplifiers	Fluidic Power Amplifier 1-4 psig monostable, Fluidic Power Amplifier 1-4 psig bistable, Fluidic Power Amplifier 1-8 psig monostable, Booster 20 to 120 psig, Booster 1 to 20 psig, 3-Way Sensor Relay
	Information Display	Pop-Up Indicator, Numeric Readout, Alphanumeric Readout, Monitor Display, Single Character Readout, Fluidic-Mechanical Counter
	Fluidic-Electric Interface	Fluidic-Electric Miniswitch, Fluidic-Electric Switch
Logic The Pitney-Bowes FLOWBOARD made fluidics practical and economical for industrial controls. It is a versatile, trouble-free way of packaging the NOR logic gates which process control data. FLOWBOARD gates are compatible with one another and with external fluidic components furnished by Pitney-Bowes.	FLOWBOARDS	FLOWBOARD 22, FLOWBOARD 8
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Pitney-Bowes
Fluidic Controls
 Research Drive, Glenbrook, Conn. 06906

Converting advanced technology into practical application



FLOWBOARDS for logic in Fluidic Control Systems

In any control system, input devices sense events and initiate instructions in the form of control signals, while output devices convert these low-level signals into usable energy forms for controlling cylinders, valves, actuators, motors and other work-producing means. Logic is usually required to interpret the input signals, make decisions based upon this information, and issue command signals to appropriate output devices for control action.

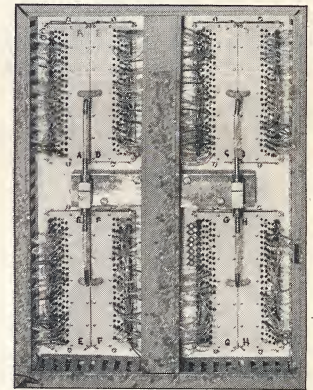
For the implementation of fluid logic, Pitney-Bowes has developed the FLOWBOARD. The FLOWBOARD is a precision molded assembly that contains a number of identical FLOWBOARD gates, all served by a common manifold leading from a single supply port. Input-output connectors make hooking up and using fluidic elements easy, economical and predictable. Its unique design features are recognized by U.S. Patent No. 3469593.

Each FLOWBOARD gate is a flowmode device, one which utilizes laminar-turbulent flow phenomena. In each identical FLOWBOARD amplifier, a laminar jet is directed to an outlet port. In the absence of a control signal input, the laminar jet reaches the outlet. A control signal input produces a gate output signal. However, a signal at any control inlet destroys the laminar flowmode. The resulting turbulent flow escapes through the vents, and the gate output is then zero. Thus, the output may be controlled by a single input. When connected with several control inputs, the FLOWBOARD gate becomes a NOR logic element. Being a basic logic function, NOR gates can be combined to perform any digital logic operation.

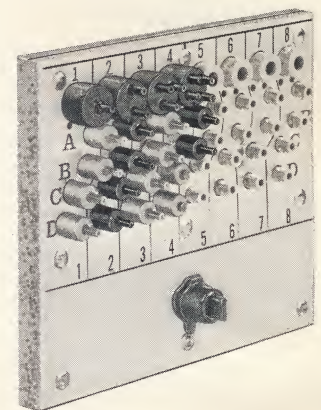
A FLOWBOARD gate can control as many as four other FLOWBOARD gates. Gates signals for machine control might also be fanned out this way, but conservative design practice is to use a separate "buffer" gate for each control output. Each gate may be controlled by as many as four independent input signals. They may fan in from other gates or from input signals to the control system. Adherence to these simple fan-in and fan-out rules guarantees predictable gate performance without impedance matching or tuning.

The FLOWBOARD Gate

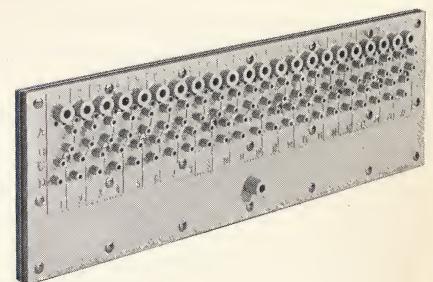
brings the high reliability, low cost and convenience of fluidics to industrial control. These FLOWBOARDS are part of a system for controlling a programmed sequence of operations on an automatic turret lathe. This sequence may be readily changed utilizing manual input selectors on the control console.



6080 065 FLOWBOARD 8



6080 001 FLOWBOARD 22



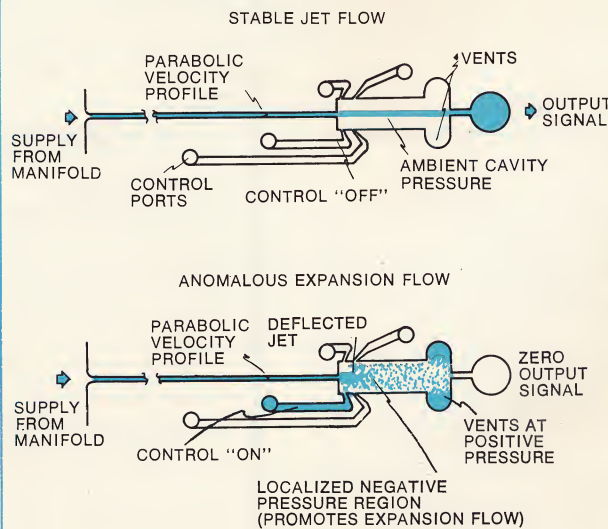
What it does

The FLOWBOARD Gate

Delivers an output signal in the absence of signals at all four control ports — delivers zero output when-ever an input signal is present at any one or more of its four control inlets.

(The FLOWBOARD amplifier is a digital device, i.e., it has two possible states, "on" or "off" and is always in one of these two states.)

Schematic



Typical Performance

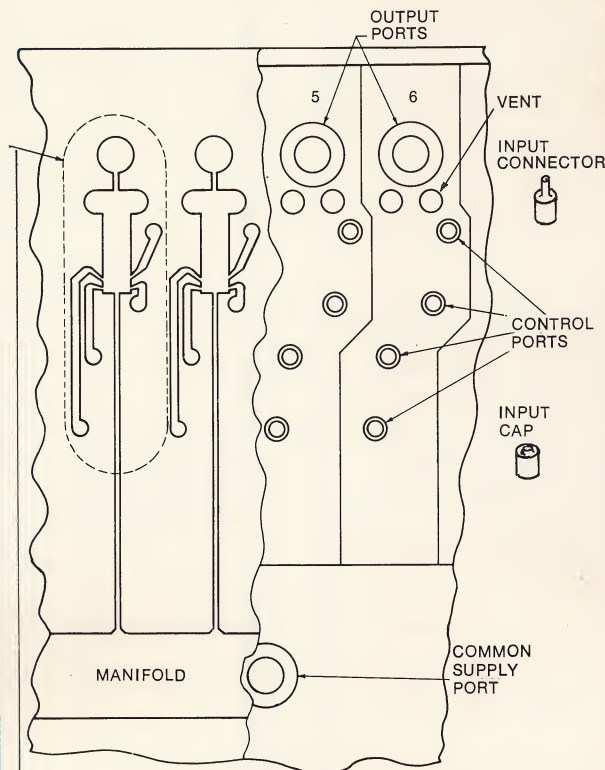
Can control one, two, three or four other gates — can be controlled by one, two, three or four signals from gates or other sources — can actuate a control output device — 1 to 3 ms response, depending on supply pressure and load characteristics. Consumes only 0.01 scfm at standard 1.3 psig system supply pressure.

6080 065

FLOWBOARD 8

Manifolds clean air supply to a compact assembly of eight FLOWBOARD gates and provides convenient ports for control interconnections.

FOUR TYPES OF OUTPUT CONNECTORS AVAILABLE

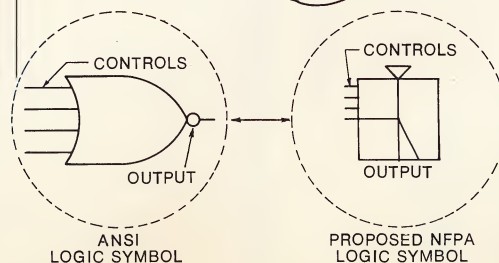


Uses approximately 0.1 scfm at standard 1.3 psig system supply pressure — each NOR gate provides fan-in of four and fan-out of four

6080 001

FLOWBOARD 22

Manifolds clean air supply to a compact assembly of 22 FLOWBOARD gates and provides convenient ports for control interconnections.



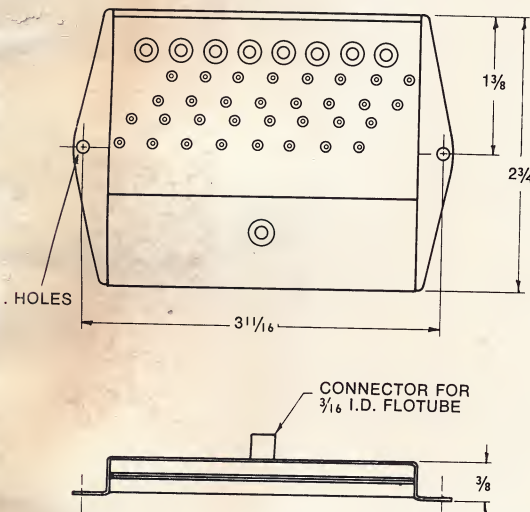
Uses approximately 0.25 scfm at standard 1.3 psig system supply pressure — each NOR gate provides fan-in of four and fan-out of four.

Installation Details

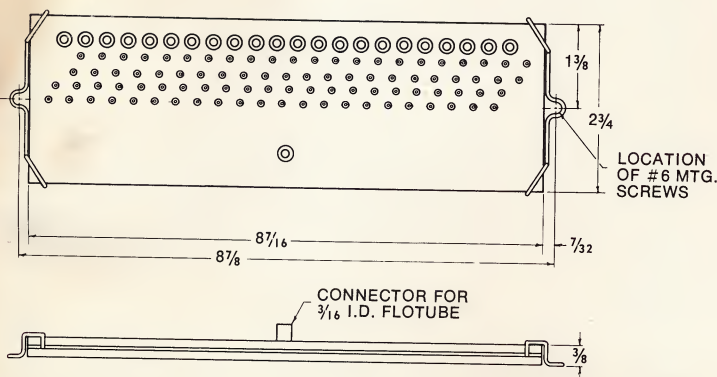
The FLOWBOARD amplifier is a pure fluid device which performs the NOR logic function. NOR elements may be combined to generate any other logic operation. Since most logic requires several NOR elements in combination, FLOWBOARD amplifiers are provided in packaged structures such as the FLOWBOARD 8 (8 NOR elements) and FLOWBOARD 22 (22 NOR elements) and, when desired, as integrated circuits in the form of FLOWBRIKS (up to 130 NOR elements).

The FLOWBOARD is designed

- to provide a single supply connection to a multiplicity of gates
- with NOR logic gates from which other basic logic functions AND, OR, NAND and FLIP-FLOP can be simply derived as needed
- for low power consumption (50 milliwatts per gate)
- with load insensitive elements, eliminating the need for impedance matching or circuit tuning
- for ease of circuit integration into FLOWBRIKS
- for ease of installation



Caps, Connectors, Flotube and Mounting Brackets available in FLOWBOARD 8 Accessory Kit, Part No. 6090 061



Caps, Connectors, Flotube, and Mounting Brackets available in FLOWBOARD 22 Accessory Kit, Part No. 6090 060

Application Considerations

Dry air filtered clean to 1 micron is essential for long-term reliability — 1.0 to 1.6 psig supply pressure — unused control ports should be capped — use a separate buffer gate at each amplifier output when used for controlling devices other than similar gates — for lengths of tubing less than 5 ft. add 1 ms delay for each foot of interconnecting tubing.

Typical Uses

- To perform the logic required for
- event-based sequencing, safety interlocking
 - time-based sequencing and programming
 - memory of process or system status
 - counting, actuating at pre-selected count
 - generating alpha-numeric displays

Control connections made by hand with flexible tubing are appropriate for prototypes, low production requirements or systems requiring periodic changes — all FLOWBOARD gates are identical, and above application considerations apply.

- to provide a few gates for a small system
- to provide a few gates in a remote cabinet
- to complete a system where an additional FLOWBOARD 22 is unnecessary
- for prototype system development
- for production requirements FLOWBRIK integrated circuits are recommended

Control connections made by hand with flexible tubing are appropriate for prototypes, low production requirements or systems requiring periodic changes — all FLOWBOARD gates are identical, and the application considerations tabulated for the FLOWBOARD gate apply.

- to provide logic gates required for fluidic industrial control
- used with FLOWBRIK integrated circuits to allow flexibility for future changes in a few aspects of control function or program
- for prototype system development
- for production requirements FLOWBRIK integrated circuits are recommended

FLOWBOARDS are also available with 4, 6, 10, 15, and 17 gates. We invite your inquiry about a FLOWBOARD to meet your special requirement.

The products you will need for complete fluidic control systems are available from Pitney-Bowes

The fluidic products described in this publication have been grouped together for your convenience in making comparisons during the selection process. They are a segment of our complete line of compatible standard components. All Pitney-Bowes fluidic controls are designed to operate with one another in systems. No tuning or matching is necessary.

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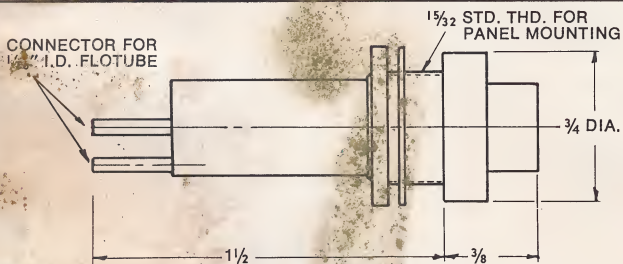
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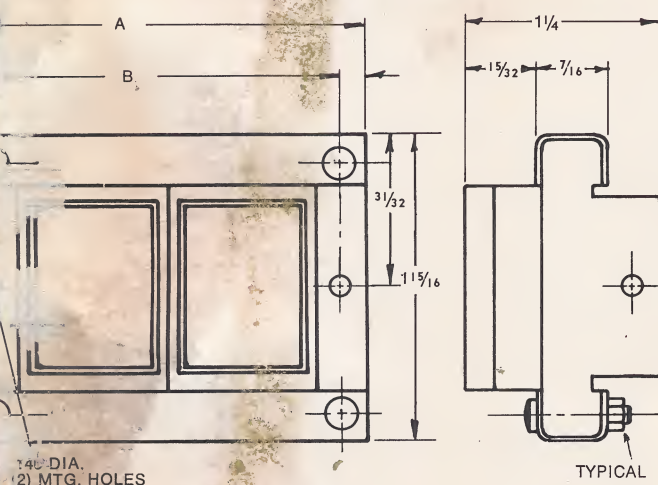
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 Research Drive, Glenbrook, Conn. 06906

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Installation Details



Connectors to Matrix Displays accept standard 1/16" I.D. Flotube



Multi-Character Readouts					Number of Characters
Part Number			Inches		
Single Character	Numeric	Alphanumeric	A	B	
6090 048	6080 022	6080 032	2 ¹⁷ / ₃₂	2 ⁷ / ₃₂	2
6090 049	6080 023	6080 033	3 ³¹ / ₆₄	3 ¹¹ / ₆₄	3
6090 050	6080 024	6080 034	4 ⁷ / ₁₆	4 ¹ / ₈	4
6090 051	6080 025	6080 035	5 ²⁵ / ₆₄	5 ⁵ / ₄	5
6090 052	6080 026	6080 036	6 ¹¹ / ₃₂	6 ¹ / ₃₂	6
6090 053	6080 027	6080 037	7 ¹⁹ / ₆₄	6 ⁶³ / ₆₄	7
6090 054	6080 028	6080 038	8 ¹ / ₄	7 ¹⁵ / ₁₆	8
6090 055	6080 029	6080 039	9 ¹³ / ₆₄	8 ⁵⁷ / ₆₄	9

Application Considerations

Has two connections — operates ON or OFF in response to pressure differential — can be driven by complementary signals from two FLOWBOARD gates.

Typical Uses

- as an ON-OFF indicator
- to signal OK or REJECT
- as an alarm
- as a status indicator
- as a component in a matrix for distant reading

Designed for operation by a FLOWBRIK — integrated — seven bar encoder circuit. Requires seven connections with an additional two available for a modified character style.

- To display a count of:
- cycles or operations
 - parts or packages
 - revolutions or strokes
 - elapsed time

May be operated by a FLOWBOARD or FLOWBRIK Logic Circuitry.

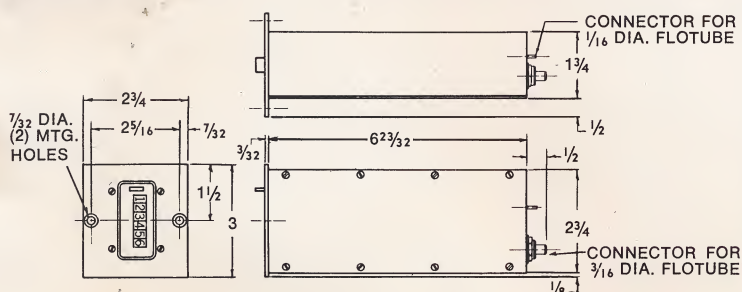
- In an array to display words, numbers, special symbols or other information.

May have as many as 35 separate connections, each controlling one dot in response to signals from a FLOWBOARD gate.

- to display coded information
- to trace progressive operations
- to verify OK status at many points

Requires only two connections — can be driven by two sensor relays or other low pressure sources.

- To display a letter, number, arrow, arithmetic symbol or special character.



Powered by standard 1.0 to 1.6 psig clean air supply — internal sensor relay protects system against contamination.

- To display a cumulative count of:
- cycles or operations
 - parts or packages
 - revolutions or strokes
 - elapsed time

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